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AUTHOR Duchesne, Robert E., Jr.
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ABSTRACT

A study examined how developmental learning and adaptive flexibility relate to critical thinking though a survey of 119 organizational leaders (of 341) who had attended a 5-day Leadership Development Program. A questionnaire adapted from the Center for Creative Leadership's Job Challenge Profile measured developmental learning, the Adaptive Style Profile measured adaptive flexibility, and the Watson-Glaser Critical Thinking Appraisal measured critical thinking. The study also identified factors that describe the nature of developmental learning factors perceived to be most significant to leadership development. Results showed years of education to be the only significant predictor of critical thinking. Adaptive flexibility scores indicated minimal levels of reflective observation. The factor analysis of developmental learning experiences identified the following factors that characterized developmental learning: career crisis, high stakes, management development opportunities, reduction decisions, mentor or role model, and discrimination. A revised model was developed that more accurately depicted the developmental learning process of leaders through workplace learning experiences. The model consisted of two paths: a confirmatory relearning path corroborating an existing model of learning and a developmental learning path resulting in a revised model of meaning. (Contains 57 references.) (YLB)

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# CRITICAL THINKING, DEVELOPMENTAL LEARNING, AND ADAPTIVE FLEXIBILITY IN ORGANIZATIONAL LEADERS

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Robert E. Duchesne, Jr.

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ABSTRACT

Organizational leaders in today's global marketplace must continually make decisions, solve problems, and chart effective courses of action for their companies to survive and flourish. The ability to think critically is essential for today's leaders, yet leaders are often unable to do so. Research and theory indicates that leaders who think critically have had challenging workplace learning experiences such as starting an operation from scratch or making a serious business error. Leaders who adaptively flex their learning style learn more from each workplace learning experience. This study examined how developmental learning and adaptive flexibility relate to critical thinking in a sample of 119 organizational leaders. A questionnaire adapted from the Center for Creative Leadership's Job Challenge Profile measured developmental learning; the Adaptive Style Inventory measured adaptive flexibility; and the Watson-Glaser Critical Thinking Appraisal measured critical thinking. The study also identified factors that describe the nature of developmental learning for the sample of leaders and determined the developmental learning factors perceived to be most significant to leadership development. Data were analyzed using hierarchical multiple regression, ANOVA, and factor analysis. Results showed years of education to be the only significant predictor of critical thinking in the leaders studied. Adaptive flexibility scores indicate minimal levels of reflective observation, suggesting decision-making may become automatized for these leaders. The factor analysis of developmental learning experiences identified several factors that characterize the developmental learning of the leaders studied. The theoretical and practical significance of the findings are discussed.

## INTRODUCTION

To compete successfully in the global marketplace, organizational leaders must solve complex problems and make important decisions continually. Success at problem solving and decision making requires higher order skills such as critical thinking and integrative problem solving (Feldman, 1991). Critical thinking is "reasonable, reflective thinking that is

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focused on what to think or do" (Ennis, 1985, p.54). Research on critical thinking attempts to describe "how individuals think about and solve complex problems" (Brabeck, 1980, p. 13).

Highly developed critical thinking skills are rapidly becoming essential characteristics of successful leaders in today's organizations (Porter, Muller, & Rehder, 1989). A leader with critical thinking abilities will "effect action of enlarged scope and heightened quality" (Neumann, 1989, p. 17). Critical thinking ability cuts to the heart of managerial work (Tanouye, 1989). Pierce (1990) states that developing critical thinking abilities needs to be a "central process" in management education. In a global economy, business enterprises must "question current operating practices to revitalize and improve organizational functioning" or face "decline and death ... Critical thinking may be our best chance to increase the odds for organizational survival in the twenty-first century" (Pierce, 1990, p. 4).

Workplaces where critical thinkers are prized indicated excellence in the ten top American corporations studied by Peters and Waterman (1982). Critical thinking can be seen as a "distinguishing commonality in successful companies" (Kanter, 1983, p.140) and a "central element in improving organizational performance" (Brookfield, 1987, p. 139). The decisions leading to the disaster and destruction of the space shuttle Challenger and to the Exxon Valdez oil spill in Prince William Sound underscore the impact that failure to engage critical thinking processes can have (Pierce, 1990). Analysis of both tragedies

revealed "severe deficiencies in critical thinking at various management levels" (Pierce, 1990, p. 5), e.g., not heeding recommendations from space shuttle engineers to halt the Challenger's launch sequence because of very cold temperatures.

The general problem area for this study is: What can organizations do to develop critical thinking skills in leaders? The specific problem this study addressed was: How do differences in workplace developmental learning events and individual characteristics, including adaptive flexibility, relate to critical thinking ability?

## BACKGROUND

John Dewey's (1916) early work on cognitive development suggests that challenging and/or disorienting experiences stimulate the development of thinking ability. Daloz (1986) describes how events or experiences that challenge the structure of one's world-view will tend to prompt development. The highly developed person judges events and manages actions in a strong yet flexible manner and is always open to new experiences and further learning (Daloz, 1986).

Several research studies conducted at the Center for Creative Leadership (McCall, Lombardo, & Morrison, 1988; McCauley, Ruderman, Ohlott, & Morrow, 1994) suggest that challenging workplace learning events stimulate the development of successful organizational leaders. The "developmental potential of a work experience is driven by the challenges it presents" (McCall, 1988, p. 8). Successful leaders' careers are marked by a variety of specific challenging work assignments and

disorienting experiences, like starting an operation from scratch, making a huge leap in scope of responsibility, having a particularly marvelous (or intolerable) boss, making a serious error, or turning around a business in deep trouble.

Kolb's (1984) model of experiential learning as a grasping and transforming process consists of four dimensions: concrete experience, reflective observation, abstract conceptualization, and active experimentation. Adults often develop a preference for one or more of the four dimensions. However, the more a learner is able to adapt his/her learning style to the demands of the particular learning situation, the better the potential for significant learning to occur (Kolb, 1984).

Adaptive flexibility is the fuel of integrative development (Kolb, 1984). Integrative development is characterized by a more integrative and discriminating world-view, cognitive complexity, hierarchically ordered cognitive structures, and a more holistic understanding of the world (Kolb, 1984). Integrative development implies critical thinking ability. An adaptively flexible leader can more successfully manage in the global marketplace than a leader who is not adaptively flexible (Kanter, 1983; Payne, Bettman, & Johnson, 1993).

## CRITICAL THINKING RESEARCH

By and large, the majority of studies of critical thinking have been conducted on young adults, often of college age with little "real world" experience. In most instances, sample sizes have been small, increasing the likelihood of a Type II error.

For example, Yuill (1992) found no difference between age and critical thinking, a result contrary to other studies with larger sample sizes and subjects with broader age distributions. Many of the studies cited show small effect sizes, even those with larger sample sizes (e.g.. Terenzini, Springer, Pascarella, & Nora, 1994) , often leaving up to 80% of the variance in critical thinking unexplained.

The research generally reveals a strong relationship between critical thinking and age and/or educational level (Glaser, 1941; Holmgren & Covin, 1984; McCutcheon, Hanson, Apperson, & Wynn, 1992; Pearson, 1991), intelligence and/or academic achievement (Betts, 1950; Brubaker, 1972; Little, 1972) and years of experience (Bishop, 1986). Results on critical thinking differences between the genders are conflicting. Men scored significantly higher on critical thinking than women in Simon and Ward's (1974) study. Women scored significantly higher than men in Schafer's (1972) study. Several studies revealed no significant differences between men and women on critical thinking (Burns, 1974; Cooney, 1976; Kehler, 1982).

DEVELOPMENTAL LEARNING RESEARCH

The most significant learning for managers occurs through workplace experiences, not in formal training programs (McCauley, 1986). Challenging job assignments that test the leader's ability in many ways hold the most potential for developmental learning (Margerison & Kakabadse, 1984). Assignments broad in scope where the leader is ultimately responsible for results in a discrete area of the business can

be of great value in developing leaders (Davies & Easterby-Smith, 1984). Starting an operation from scratch or turning a failing operation around also have high potential for managerial learning and development (McCall et. al., 1988). Bosses are often excellent sources of learning for budding managers, be they mentors, coaches, or role models, both positive ones and negative ones (Klauss, 1981; Marshall & Stewart, 1981). Hardships such as demotions or career derailment can spur personal learning regarding weaknesses and areas of vulnerability (Abdelnour & Hall, 1980; Lombardo & McCauley, 1988). Formal training is useful for learning certain specific managerial skills (Zemke, 1985). Action learning (Marsick, 1990), where managers work on real workplace issues, holds significant promise for management development in today's fast-paced business environment.

## ADAPTIVE FLEXIBILITY RESEARCH

The research literature regarding Kolb's (1984) adaptive flexibility is sparse and inconclusive. With the large sample size (n=626), the power of Kolb and Wolfe's (1981) initial study may have helped uncover significant statistical relationships between adaptive flexibility and ego development, self-directedness, cognitive complexity, and lowered stress, though showing small effect sizes. Small sample sizes in Halloran's (1992) study of adaptive flexibility and components of a cardiac rehabilitation program may have compromised its power, resulting in the possibility of a type II error. St. Clair (1994) found no significant differences in adaptive flexibility across

nursing education program type, yet found that older students had significantly higher adaptive flexibility scores, a result supporting Kolb and Wolfe's (1981) conclusion that adaptive flexibility increases with age. Bell's (1994) significant results demonstrate the value of conducting follow-up analyses on individual adaptive flexibility scale scores. Individuals who were sensitive to situational cues and whose map of the world tended to center on the immediate concerns of their injury situation (i.e. high concrete experience adaptive flexibility) tended to take longer to return to work. A more balanced adaptive flexibility profile leads to lowered stress and increased ability to cope with challenge (Kolb, 1984).

## THEORETICAL FRAMEWORK

This study was founded in a conceptual framework derived from an integrative review of the research on factors related to the development of critical thinking. Specifically, the theoretical framework outlines the interaction between individual characteristics, experience-based developmental learning events, and critical thinking abilities.

The literature consistently identifies four variables related to critical thinking development: intelligence, education, experience and age. Learners high in adaptively flexibility tend to learn more from experiences than learners low in adaptive flexibility (Kolb, 1984). Learners high in adaptive flexibility who experience challenging workplace learning events should develop higher levels of thinking ability than learners low in adaptive flexibility. This study proposed

adding the individual characteristic variable adaptive flexibility to the model for critical thinking development in leaders.

Numerous CCL research studies (Eichinger & Lombardo, 1990; McCall, 1988; McCall et. al., 1988; McCauley et. al., 1994) suggest that challenging workplace learning events stimulate the development of successful organizational leaders. As shown in the large shaded component in the figure, this study also proposed adding the workplace developmental learning events model into a proposed model for critical thinking skills development in organizational leaders.

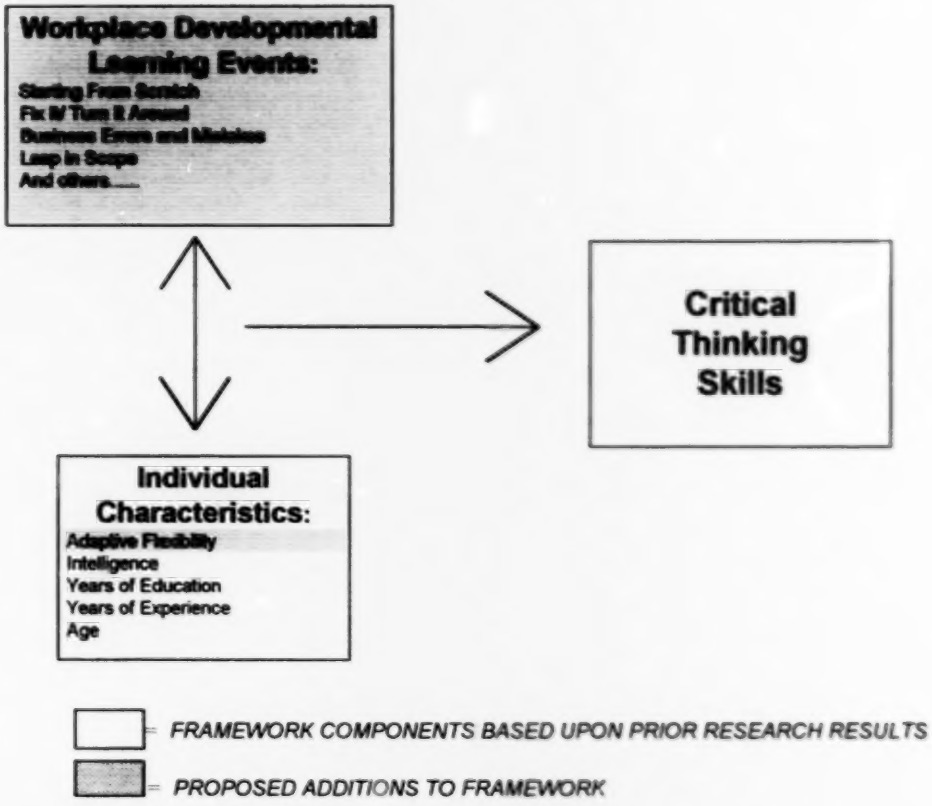


**Figure 1. Framework of factors associated with the development of critical thinking ability in leaders.**



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# METHODS AND PROCEDURES

## RESEARCH HYPOTHESES

The primary hypothesis addressed in this study was: H01. There will be no significant combination of independent variables: number of workplace developmental learning events, average perceived significance of workplace developmental learning events, and individual characteristics (adaptive flexibility, years of experience as a leader, years of education beyond high school, and age), that predict the level of critical thinking.

Two other hypotheses addressed were:

H02. There will be no combination of factors that describe the workplace developmental learning events of the leaders studied.
H03. There will be no combination of workplace developmental learning factors that predict the average perceived significance of learning of the leaders studied.

## SAMPLE

The sample consisted of 119 leaders who have attended the five-day Leadership Development Program (LDP) conducted by the Center for Creative Leadership (CCL) at Greensboro (North Carolina) or by the Professional Development Center (PDC) at the Hartford (Connecticut) Graduate Center during 1993. Sixty-three study participants attended the LDP at CCL in Greensboro accounting for 53% of the research sample. Fifty-six study participants attended the LDP at the Hartford Graduate Center

accounting for 47% of the research sample. The sample consisted of 88 males (74%) and 31 females (26%). The mean age was 42.9 years (SD=7.2) with a range from 30 years to 63 years. Years of education beyond high school ranged from 0 years to 10 years with a mean of 5.5 years (SD=1.9).

All prospective LDP attendees complete the Shipley Institute of Living Scale (SILS) which provides a quick, accurate estimate of intellectual functioning (Deaton, 1992). For LDP participants in this study the average SILS-IQ was between 118 and 125 with no-one scoring below 112. The research sample was delimited in IQ to the range approximately one to one and two-thirds standard deviation (SD=15) above the mean equivalent WAIS-R IQ of 100.

INSTRUMENTS

Data on Individual Characteristics were collected on a one page demographic data sheet developed by this researcher. Data were collected on years of education beyond high school, years of experience, age, gender, and organizational level. Participants were also asked to describe "the specific work experience that was the most influential in developing your leadership skills."

The Experiences Checklist measured workplace developmental learning events. Participants indicated which of the 43 events that they had experienced rating the perceived level of significance of learning from the experience: 0 if the leader did not have the experience, 1 if perceived "not significant," 2 if perceived "a little significant," 3 if perceived "moderately

significant," 4 if perceived "very significant," and 5 if perceived "extremely significant."

Kolb's (1979) Adaptive Style Inventory (ASI) is a 48 item, forced-choice, self-report instrument that yields individual scale scores: concrete experience adaptive flexibility (CEAF), reflective observation adaptive flexibility (ROAF), abstract conceptualization adaptive flexibility (ACAF), and active experimentation adaptive flexibility (AEAF), and a total adaptive flexibility score (TOTAF), which is the sum of the four scale scores.

The Watson-Glaser Critical Thinking Appraisal (WGCTA) is an eighty item test with five scales: inference (INFER), recognition of assumptions (ASSUMP), deduction (DEDUC), interpretation (INTERP), and evaluation of arguments (EVAL), each containing sixteen items. The total critical thinking score (TOTAF) is the sum of the 5 scale scores.

DATA COLLECTION

Packets containing cover letters from CCL and this researcher describing the study and requesting participation, the Experiences Checklist (including the demographic page), the WGCTA and answer sheet, the ASI, and a stamped return envelope were mailed to 168 Greensboro attendees on March 1, 1994. A cover letter jointly authored by the HGC Program Manager and the researcher, along with the three instruments and a stamped return envelope were mailed to 173 HGC attendees on March 15, 1994. Sixty-three of the 168 Greensboro LDP attendees (38%) chose to participate in the study. Fifty-six of the 173

Hartford LDP attendees (32%) chose to participate. The overall participation rate was 35%.

## RESULTS

### CHARACTERISTICS OF THE SAMPLE

The sample consisted of 88 males and 31 females, ages 30 to 63, 89% of whom work at "for-profit" companies. The average leader was 42.9 years old (SD=7.2), had 5.5 years of education beyond high school (SD=1.9), and had 12.3 years of supervisory experience (SD=7.1). The subjects consisted of 93 mid-level leaders (e.g.., department heads, plant managers, professional staff, mid-level administrators) and 31 executive-level leaders (e.g.., CEO's, presidents, vice-presidents, directors).

Scores on both critical thinking and number of developomental learning experiences were skewed. The mean total critical thinking score for the research sample was at the 85th percentile. All five WGCTA scale scores were also negatively skewed, creating a "ceiling effect," wherein differences in critical thinking with respect to the study's other variables may have been obscured. The variance of scores on a number of experiences items was also restricted, mainly due to the fact that many subjects had not had a number of the 43 experiences. The resulting positive skewness affected the ability to analyze the workplace developmental learning event scores.

Total adaptive flexibility scores and scores on three of the four scale scores compared favorably with the norming sample (Kolb & Wolfe, 1981). Scores on reflective observation adaptive flexibility (ROAF), however, were significantly lower than those

for the normative sample, indicating reduced use of reflective observation while learning or solving problems.

ANALYSIS OF H01

A multiple regression procedure using hierarchical forced entry was used to analyze H01 using the following order: number of workplace developmental learning events, average perceived significance of these learning events, adaptive flexibility, years of experience as a leader, years of education beyond high school, and age. A significant intercorrelation was found between age and years of experience as a supervisor, so the variable age was eliminated from the multiple regression analysis.

Each variable was initially entered into the regression equation separately, in a stepwise manner, to determine its unique contribution to the equation, as well as its proportional contribution to the final regression equation. A final regression model was developed eliminating the variables with non-significant t-values from the equation. Years of education beyond high school (YRSED) was the only independent variable with a significant t-value. The analysis was repeated using YRSED as the only independent variable.

In the research sample, years of education beyond high school (YRSED) accounted for 10% of the variance ($F=12.3$, $p<.001$) in critical thinking scores, a small to medium effect size. H01 was rejected for the variable YRSED. H01 was accepted for all other variables.

ANALYSIS OF H02

Initially two principal components analyses (one orthogonal and one oblimin) were run, both suggesting the possibility of a 16 factor solution. Both of these analyses failed the K-M-O test of sampling adequacy and identified factor scales with very low internal reliabilities (e.g., less than r=.50). Analysis of the scree plots of these initial factor analyses, however, pointed to the possibility of a six factor solution.

Items comprising the common elements of the five or six interpretable factors identified in the initial factor analyses were used to run a PCA with oblique rotation, forcing a six factor solution. The solution identified six factors which accounted for 54.4% of the variance in the items analyzed. The final factor scale scores each had scale reliability coefficients between r=.67 and r=.69. HO2 was rejected. The results of the factor analysis are in Table 1.

Table 1
Factor Analysis on Experiences Checklist

| Career Crisis (Factor 1) | | Communality | Factor Loading |
|---|---|---|---|
| I8 | ...terrible boss | .41 | .54 |
| I10 | ...demoted or dead-ended | .50 | .63 |
| I31 | ...significant conflict | .62 | .73 |
| I33 | ...passed over for promotion. | .41 | .63 |
| I38 | ...job absolutely detested | .45 | .63 |

Reliability co-efficient of scale r=.67

| High Stakes (Factor 2) | | Communality | Factor Loading |
|---|---|---|---|
| I5 | ...managed huge scope operation | .60 | .74 |
| I6 | ...huge leap in scope | .56 | .67 |
| I15 | ...bottom-line responsibility | .51 | .70 |
| I26 | ...blown a deal-large sum $$ | .44 | .45 |
| I27 | ...pulled off deal-large sum $$ | .34 | .56 |
| I29 | ...decision involve >20% assets | .42 | .45 |

Reliability co-efficient of scale r=.68

| Management Development Opportunities (Factor 3) | | Communality | Factor Loading |
|---|---|---|---|
| I21 | ...off-site management seminar | .56 | .71 |
| I22 | ...feedback on management style | .74 | .86 |
| I41 | ...course->changed mgt. style | .61 | .75 |

Reliability co-efficient of scale r=.68

(table continues)

| Reduction Decisions (Factor 4) | | Communality | Factor Loading |
|---|---|---|---|
| I17 | ...fired long-term employee | .63 | .74 |
| I18 | ...closed down an operation | .68 | .78 |
| I19 | ...laid off large # of people | .69 | .82 |

Reliability co-efficient of scale r=.69

| Mentor or Role Model (Factor 5) | | Communality | Factor Loading |
|---|---|---|---|
| I7 | ...marvelous boss | .64 | .76 |
| I39 | ...coach or advocate | .73 | .82 |

Reliability co-efficient of scale r=.69

| Discrimination (Factor 6) | | Communality | Factor Loading |
|---|---|---|---|
| I9 | ...encountered prejudice | .69 | .46 |
| I16 | ...people tried to make you uncomfortable | .48 | .41 |

Reliability co-efficient of scale r=.67

ANALYSIS OF H03

A correlation matrix consisting of the six workplace developmental learning factor scores and average perceived significance of learning revealed two potentially significant relationships. Specifically, the Factor 1 scale score (Career Crisis) and the average perceived significance of workplace developmental learning events (AVGSIG) correlated at r=.27

(p=.003); the Factor 3 scale score (Management Development Opportunities) and AVGSIG correlated at r=.56 (p<.001).

A stepwise multiple regression analysis was performed to analyze the relationship between average perceived significance of workplace developmental learning events (AVGSIG), Factor 1 (Career Crisis), and Factor 3 (Management Development Opportunities). Both factor scale scores made significant contributions to the regression equation. Total R2 after the addition of both factor scale scores equaled .36 (F=33.6, p<.001), representing a large effect size. H03 was rejected.

## CONCLUSIONS

The results of this study support the results of previous studies of learning in leaders that concluded that the most important lessons are learned from on-the-job experiences (McCauley, 1986; Baldwin & Padgett, 1993). The study's results also revealed that formal education was the only variable significantly related to critical thinking. This result supports previous research studies that found critical thinking correlated with education (Holmgren & Covin, 1984; Pearson, 1991).

The factor analysis identified six factors that describe the reported workplace developmental learning events of the leaders studied: 1) Career Crisis, 2) High Stakes, 3) Management Development Opportunities, 4) Reduction Decisions, 5) Mentor or Role Model, and 6) Discrimination. Factors 1, 2, 4, and 5 resemble factors identified in several CCL studies (Eichinger & Lombardo, 1990; McCall et. al., 1988; McCauley et. al., 1994).

Management Development Opportunities and Discrimination are new results.

Reflective observation adaptive flexibility scores were low for this sample of leaders. With lowered levels of reflection responses to situations and dilemmas at hand may have been "automatic," reinforcing previous learning when the potential for new learning and development existed.

## DISCUSSION

The model for critical thinking development in leaders proposed in Figure 1 is limited in several ways. Years of education beyond high school was the only variable significantly related to critical thinking. Challenging workplace experiences were not related to critical thinking. Adaptive flexibility was not related to critical thinking. In fact, critical thinking as measured by the Watson-Glaser test may not be the skill needed for leaders to be better problem solvers and decision makers.

The Watson-Glaser concept of critical thinking is narrowly focused and restricted. Results of this study show that WGCTA critical thinking is logic-based, single-loop (Schon 1987), instrumental (Mezirow, 1991), and weak sense (Paul, 1984) critical thinking. Schon (1987) describes critical thinking as a process whereby the individual reflects on actions and thought processes, calling into question underlying assumptions. A closer analysis of the items on the WGCTA show that correct answers can be determined by the rules of logic. No reflectivity is needed.

Reflective judgment is a structurally based cognitive ability based upon levels of cognitive schema (King & Kitchener, 1994). Reflective judgment ability is necessary for solving ill-structured problems, i.e., the kind of real-life problems encountered in the workplace that are often challenging or disorienting (King & Kitchener, 1994). Because reflective judgment is a structural, schema-based framework for conceptualizing skill in thinking and since reflective judgment ability is more suited for managing real-world, ill-structured problems, measuring reflective judgment rather than critical thinking may have been more appropriate to the purposes of this study.

## REVISED MODEL FOR CRITICAL THINKING AND REFLECTIVE JUDGMENT DEVELOPMENT IN ORGANIZATIONAL LEADERS

Based upon the results of this study and upon a follow-up review of the literature relative the study's outcomes, a revised model was developed that more accurately depicts the developmental learning process of leaders through workplace learning experiences. The framework encompasses the development of both critical thinking and reflective judgment. The model consists of two paths or tracks: 1) a confirmatory relearning path corroborating an existing model of meaning , and 2) a developmental learning path resulting in a revised model of meaning, as depicted in Figure 2.

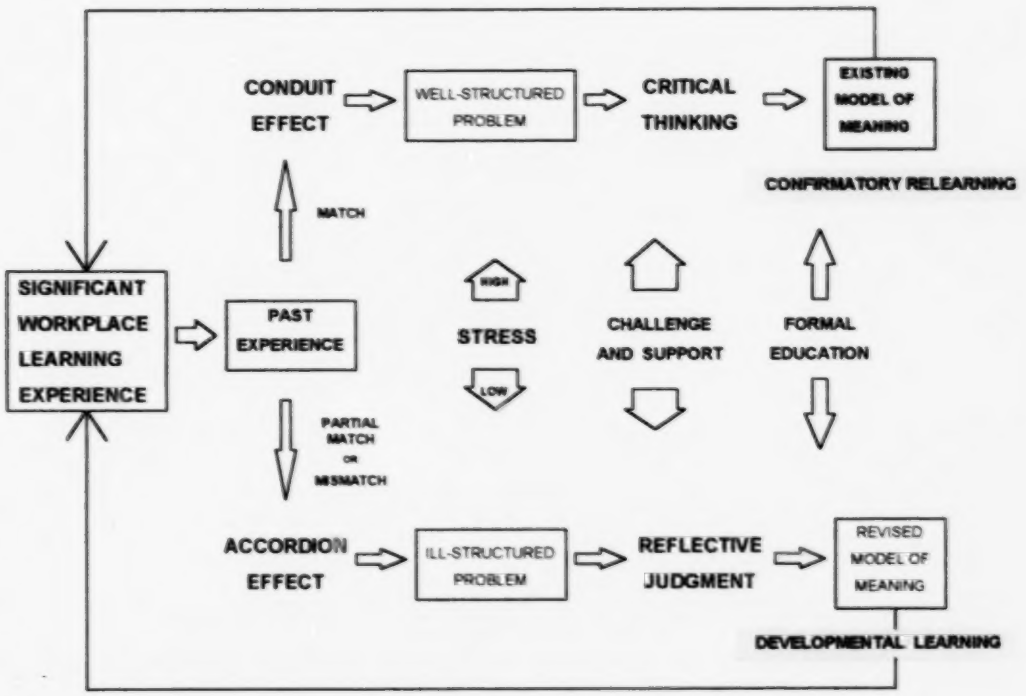


**Figure 2. Revised model for critical thinking and reflective judgment development in organizational leaders.**

When encountering a challenging problem or dilemma in the workplace (i.e., an experience with potential for significant learning), the leader will tend to view the current situation in terms of experiential scripts from previously encountered, similar situations (Dreyfus & Dreyfus, 1986). If the leader perceives a *match* between the current situation and one from past experience the "conduit effect" path is followed leading to confirmatory relearning; if the leader perceives a *partial match* or a *mismatch* between the current situation and past experience the "accordion effect" path is followed leading to developmental learning (Sheckley & Keeton, in press).

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Confirmatory Relearning. The confirmatory relearning process is triggered when the leader perceives a match between the current situation and past experience. The individual responds automatically and no "new learning" takes place. This is called the conduit effect (Sheckley & Keeton, in press). The experience is constructed as a well-structured problem. Well-structured problems can be solved using critical thinking skills (King & Kitchener, 1994). The confirmatory relearning process results in corroborating the existing model of meaning.

Whether the current situation matches, partially matches, or does not match one from previous experience depends on a number of cognitive and perceptual factors. Difficult problems or disorienting dilemmas can be painful to experience. When uncomfortable or confused, the human tendency is to attempt to return to a state of cognitive and emotional equilibrium (Piaget, 1985). Re-equilibration occurs when the individual retreats to a comfortable, secure cognitive place, avoiding pain and discomfort. Re-equlibration can prompt the leader to view the current situation as matching one from previous experience.

With more relevant experiences to draw upon an expert is more likely to perceive the current situation as analogous to one from past experience (Dreyfus & Dreyfus, 1986). For example, if a dip in retail sales was previously corrected by a more aggressive advertising campaign, a sales manager may respond to the current decline in sales with an analogous response. This is an example of an automatized response with very little reflection taking place. A reflective analysis of

the current problem may have uncovered a defect in the product. In this example the automatized response would not solve the problem.

Developmental Learning. The developmental learning process is activated when the individual perceives either a partial match or a mismatch between the current situation and past experience. The hierarchical structure of the individual's "world view" or "model of meaning" is abandoned or altered in some way. The reflective system is activated and new learning takes place. This is called the accordion effect (Sheckley & Keeton, in press). If the current problem or circumstance is viewed as novel, the leader will construct the experience as an ill-structured problem with its attendant ambiguity and uncertainty. Ill-structured problems are best solved using reflective judgment (King & Kitchener, 1994). The developmental learning process results in the creation of a revised model of meaning.

The novelty encountered due to the cognitive mismatch or partial match between the current situation and past experience triggers reflectivity (Sheckley & Keeton, in press). Reflective thinking is necessary for people to effectively resolve ambiguous, controversial, and uncertain dilemmas (Daloz, 1986; Dewey, 1938). Reflective thinkers continually evaluate potential solutions to problems in light of existing information, though often incomplete or unverifiable. Reflective thinking takes time and effort. Reflective judgment brings closure to a situation that is uncertain (King & Kitchener, 1994). Reflective judgment results in the

development of a more integrative and discriminating understanding of the problem at hand, and in an enlightened decision. Reflective action requires taking action on a given problem or dilemma while continually reflecting on the outcome of that action in light of the new information and insights generated during the process (Daloz, 1986; Mezirow, 1991).

The stress of disconcerting circumstances and the pressure to take immediate action can sometimes be overwhelming for a leader facing a difficult situation. High levels of stress and pressure compromise a leader's ability to make sound decisions and take effective action (Fiedler & Link, 1994). A common perception that permeates Western work culture is that if an individual is not "in action," s/he is not doing anything productive. To the contrary, reflection is necessary to make good decisions. Leaders need to guard against the pressure to take immediate action caused by stress. To do the right thing is much better than to just do something.

## IMPLICATIONS FOR PRACTICE

The results of this study support the results of prior studies that concluded that significant learning for leaders comes from experience, from learning by doing the job, and from job challenges (Baldwin & Padgett, 1993; Lombardo & Eichinger, 1989; McCall et. al., 1988; McCauley, 1986; McCauley et. al., 1994). Giving challenging job assignments such as creating and managing change can create the conditions for significant learning and development.

Results of this study support Eichinger and Lombardo's (1990) contention that courses that focus on self-awareness are important to leader development. Seventy-six percent of this study's participants rated their learning from receiving feedback on their managerial style as very or extremely significant. Receiving direct feedback from peers, superiors, and subordinates can often trigger reflective learning.

Stress can negatively impact performance in leaders (Fiedler & Link, 1994). Creating a workplace culture that is supportive, is accepting of mistakes, and values well-thought-out decisions and strategies can reduce stress.

Encouraging the broader use of group discussion, reflection, and decision making can stimulate increased reflectivity in organizations, more adequate analysis of the issues, and better decisions. Also, encouraging leaders to look for the unique characteristics in a particular situation that may initially look mundane can often lead to new learning and to the choice of a more adequate course of action.

The type of reflection currently gaining popularity in organizations targets learning that results in increasingly effective action by individuals and groups. Reflection also leads to more objectivity, self-confidence, a heightened sense of personal responsibility, increased tolerance for ambiguity and paradox, the unlocking of creativity and intuition, enlightened action, and a more balanced life (Sherman, 1994). Learning to be reflective takes commitment, time, and effort. The sense of focus, clarity, contentment, and effectiveness that

are demonstrated outcomes of reflectivity are worthwhile outcomes for organizational leaders to strive to achieve.

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